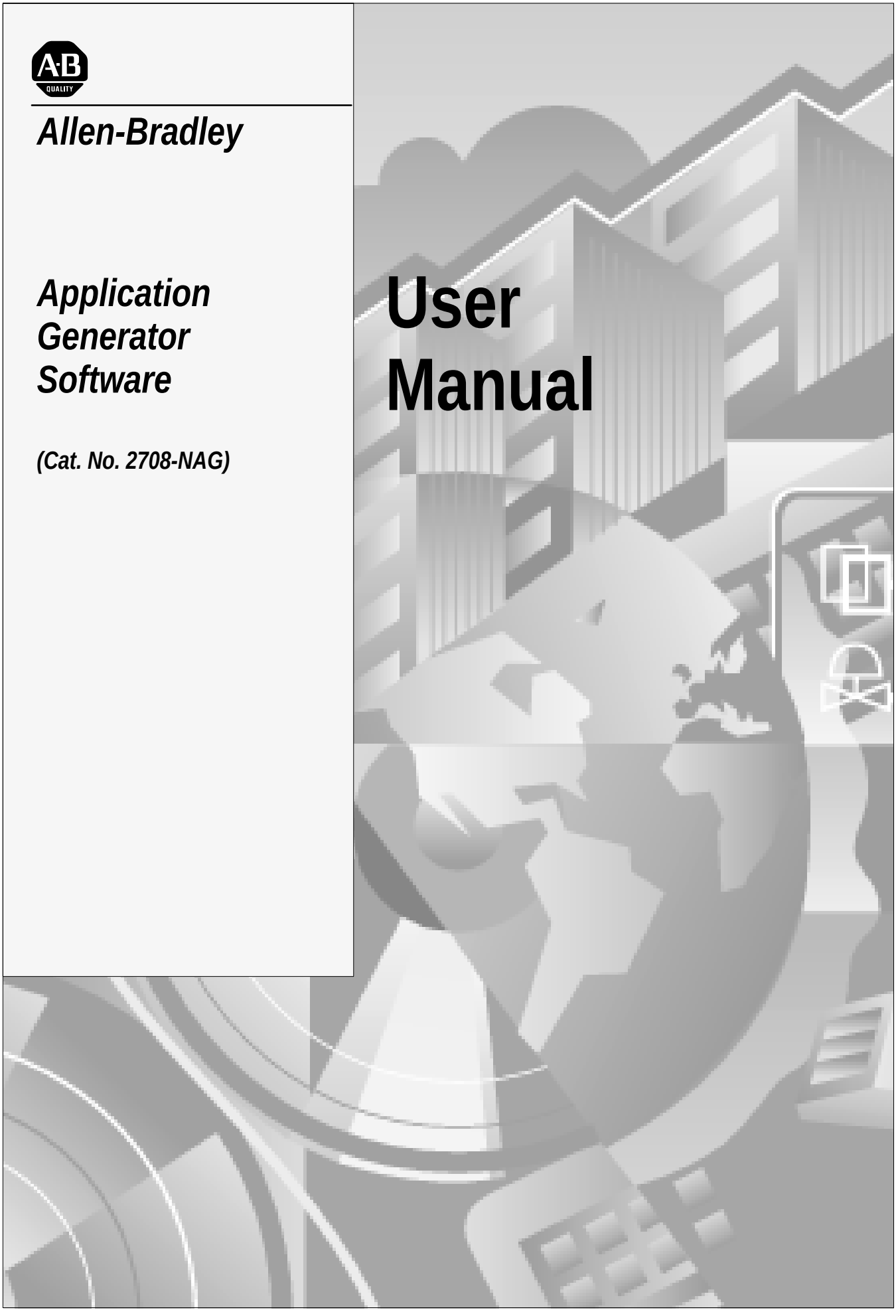
Allen-Bradley

Application Generator Software

(Cat. No. 2708-NAG)

User Manual



Important User Information

Solid state equipment has operational characteristics differing from those of electromechanical equipment. “Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls” (Publication SGI-1.1) describes some important differences between solid state equipment and hard–wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

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ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss.

Attentions help you:

- identify a hazard
- avoid the hazard
- recognize the consequences

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Chapter 1

Overview

This brief chapter provides an overview of the A-B VBASIC Applications Generator Software (Cat. No. 2708-NAG). The topics it covers include descriptions of:

- What it is
- What it does
- Who can use it
- How it works
- Contents of this manual

What Is It?

The Application Generator (AG) is an interactive program development tool for Catalog No. 2708–DH5B2L and -DH5B4L products from Allen-Bradley Company. It simulates a workstation on a standard personal computer (PC).

An AG developer trains a DH5 workstation by interactively modifying its current behavior until the desired functions are achieved.

Because the developer is working with the actual *operation* of the program, instead of trying to relate the program's behavior to a listing of program source code, development with AG is both faster and more intuitive than using traditional programming techniques. AG allows a wider range of programmers to develop software. It no longer requires a "software engineer" to write an application program within a reasonable amount of time.

What Does It Do?

The simulation is controlled by the AG master program. The AG developer first loads an initial **personality file** (with the extension .AIP) into the simulator program.

The personality file contains a set of operations which are eventually compiled into an A-B VBASIC program. The operation of the program is controlled by menu selections within AG.

Unlike an actual program, the personality can be executed stepwise, both forward and backward. Any operation the simulator program performs can thus be "undone". The developer can easily insert missing operations, and delete extraneous operations.

When the program successfully simulates a desired application, it generates an A-B VBASIC program. On the workstation, that program will perform identically to the A-B VBASIC computer simulator.

Who Can Use It?

An AG developer should have a good grasp of the problem to be solved, and be familiar with use of PC-–based products. General programming skills may be beneficial, although they are not required.

While AG substantially decreases development time, and improves overall program quality, it cannot duplicate the in-depth problem analysis, and insight available only from a human developer.

How Does It Work?

The simulation is controlled by the AG master program. The AG developer loads an initial personality (.AIP) file into the simulator program.

The personality will contain a set of operations that are eventually compiled into an A-B VBASIC program. The operations are selectable from menus within AG.

Unlike a program, a personality can be executed stepwise, both forwards and in reverse. This means that any operation the simulator program performs can be undone. This provides true ‘hands on’ access to programming instead of the more common indirect approach.

The AG developer steps forwards and backwards through the operation of the current personality. Where operations are missing, the developer inserts them. If the personality performs extraneous operations then the developer deletes them.

Contents of This Manual

This manual provides the information necessary to use the Application Generator software. It includes 4 chapters and an appendix.

Table 1.A
Summary of Contents

Chapter	Title	Purpose
1	**Overview**	Provides an overview of the manual.
2	**Installing and Starting Application Generator**	Describes how to install the software on your system, and how to begin using it.
3	**Using Application Generator**	Describes how to navigate the software’s menu system and create your own application simulations.
4	**Running & Compiling Applications**	Describes the steps necessary to compile an application based upon your successful simulation.
Appendix A	**Sample Program Listing**	Provides a complete listing of the default application for reference and further study.
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Conventions Used

The following conventions are used in this manual:

- All menus and screens reproduced in this manual are approximate renderings of what you will see on your terminal screen. Allen-Bradley reserves the right to make minor modifications to any menu or screen to help improve performance.
- A symbol or word appearing in brackets represents a single key on the computer keyboard. For example: **[ESC]**, **[ENTER]**, or **[BACKSPACE]**.

  On some keyboards, the **[ENTER]** key is labeled **[↵]** or **[RETURN]**.
- The Application Generator software has many configuration parameters from which you can choose. Throughout the manual these parameter names are *italicized* wherever they appear.
- Information which you can select or enter into the menus or screens appear in the text as **bold** type.

Related Publications

Other publications to which you may want to refer include:

Publication No.	Title	Purpose of Publication
2708-801	Application Generator User Manual	Describes how to use Application Generator Software to create custom application programs.
2708-802	Network Manager User Manual	Describes how to use the Network Manager Software to configure the workstation for a variety of network configurations.
2708-803	Basic Language Kit User Manual	Describes how to use the Basic Language Kit source files to reduce program development time.
2708-2.3	A-B VBASIC vs. Visual BASIC ™	Describes the differences between standard Visual BASIC ™ and the Allen-Bradley VBASIC modified for use with the 2708-DH5B_L workstation.
2708-2.2	Interfacing a 2708 Attended Workstation Network with a Flexible Interface Module	Describes how to implement the 2708-DH5 into the 1771 architecture

Chapter 2

Installing and Starting Application Generator

This chapter contains information which will help you prepare to use the AG software to develop new applications. It includes information on:

- System requirements
- Installation instructions
- Starting AG
- The default personality

System Requirements

AG requires an IBM PC or IBM PC compatible which has at least 512K of RAM, a hard disk, and DOS 3.2 or later. Because AG must have access to the **VB** command during operation, your system must be equipped with a complete and functional copy of Microsoft™ Visual BASIC.

Installation

Before running install, you should change to the floppy drive containing the diskette which has the INSTALL.BAT file on it. You should be at the A: or B: prompt.

To install AG on drive C, type : **INSTALL C: [ENTER]**

To install AG on drive D, type : **INSTALL D: [ENTER]**

AG must have access to the **VB** command during operation, so you must also have a complete and functional copy of Microsoft Visual BASIC Version 4.5 or later on your system.

Starting Application Generator

First, change directories to **AG**:.

At the C or D prompt, depending on the location of the AG directory, change the path to AG.

C:\ > **CD \ AG [ENTER]**

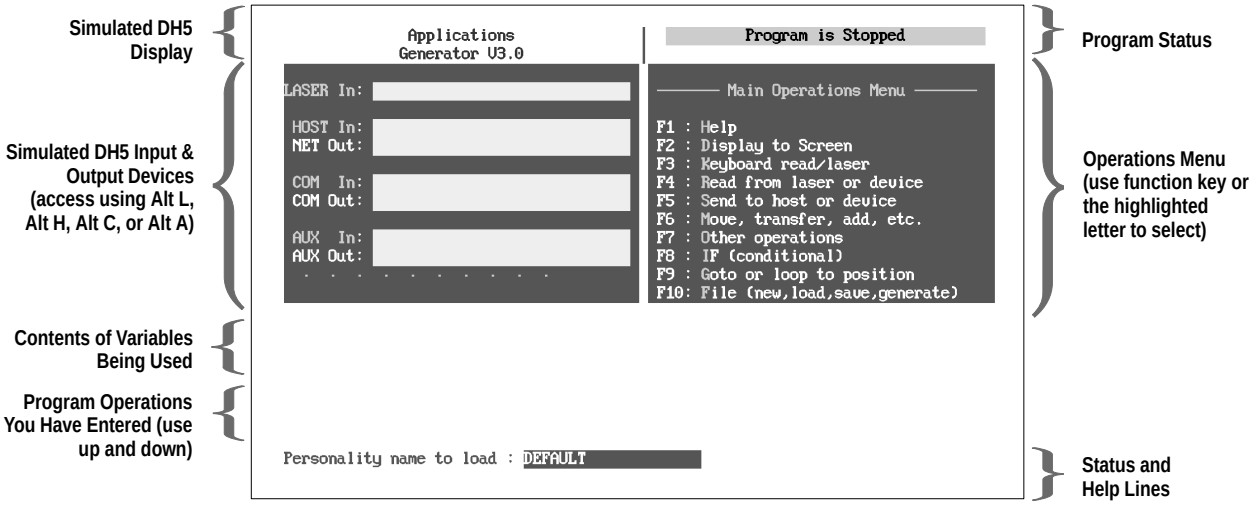
Then type **AG** to start the program.

C:\ **AG** > **AG [ENTER]**

A welcome screen identifying the program and its version number will appear briefly as the program loads. It will be followed by the AG Main Operations Screen.

The AG screen appears below. Note that the screen contains a number of functional areas that remain consistent throughout the program.

Figure 2.1
Application Generator Main Screen at Startup


Simulated DH5 Display
Simulated DH5 Input & Output Devices (access using Alt L, Alt H, Alt C, or Alt A)
Contents of Variables Being Used
Program Operations You Have Entered (use up and down)
Applications Generator V3.0
Program is Stopped
LASER In:
HOST In:
NET Out:
COM In:
COM Out:
AUX In:
AUX Out:
Main Operations Menu
F1 : Help
F2 : Display to Screen
F3 : Keyboard read/laser
F4 : Read from laser or device
F5 : Send to host or device
F6 : Move, transfer, add, etc.
F7 : Other operations
F8 : IF (conditional)
F9 : Goto or loop to position
F10: File (new,load,save,generate)
Personality name to load : DEFAULT
Program Status
Operations Menu (use function key or the highlighted letter to select)
Status and Help Lines

The Default Personality

On the last line of your CRT you will see a message:

Personality name to load: Default

The default personality is a sample application development program which simulates a number of typical DL5 functions:

- Displays a message Use **F1** to **F4**
- Waits for user to enter a badge or press a function key.
- Branches to various editing and entry routines to illustrate many of the features of AG.
- Sends the badge data to the host.
- Loops back to the start.

You may call up this personality simply by depressing the **[ENTER]** key. A complete listing of this program appears in Appendix A.

You can exit from the program at any time by pressing **[ALT] X**.

For additional information on AG commands, refer to Chapter 3.

Chapter 3

Using Application Generator

This chapter provides a detailed summary of how you can use AG to generate your own custom applications. It includes:

- a concise summary of the keystrokes used by the program
- an explanation of variables as used in AG
- an explanation of each menu choice on the AG screens
- instructions for editing a program

Keystroke Summary

The following list provides a summary of the special keystroke functions recognized by AG.

Basic Control Key Functions

Commonly used keys for controlling the Applications Generator.

[ALT] R	RUN the program starting at line 1 (ESC to stop).
[ALT] G	Go (RUN) starting at this line.
[ALT] U	Undo back to this line.
[ALT] E	Edit the current program in full screen mode.
[ALT] V	List the variables in the program.

[Up Arrow]	Undo the previous line (if stepping) or up one line.
[Down Arrow]	Execute the next line (if stepping) or down one line.
[INS]	Toggles into single step mode.
[ESC]	Stop running or abandon current operation
[DEL]	Delete line or operation. Press twice.
[ENTER]	Edit current operation.

Simulated Device Input Keys

[ALT] L	Simulate input from bar code port (key entry).
[ALT H	Simulate input from host computer (key entry).
[ALT] C	Simulate input from COM1 RS-232 line (key entry).
[ALT] A	Simulate input from COM2 RS-232 line (key entry).
[ALT] F	Select a DOS file to use for simulated inputs. Specify the input device by entering the first letter of **L**aser, **H**ost, **C**om, or **A**ux.
[ALT] N	Simulate the next line of input from the response file (file entry).

Special Purpose Keys

[PAGE UP]	Skip up 6 lines or change field size.
[PAGE DOWN]	Skip down 6 lines or change field size.
[END]	Move to the end of the program.
[HOME]	Undo or move to the start of the program.
[ALT] I	Set or clear the interrupt (breakpoint).
[ALT] D	Allows you to specify a device log file that will store I/O transactions.
–	Moves the current line to the edit buffer.
+	Copies the current line to the edit buffer.
*****	Inserts the edit buffer above the current position.

Variables

Variables are named storage locations. They can each hold up to 80 characters of information. When you start AG, you are given the variables “IN”, “OUT”, “SRC”, “NET”, “COM”, and “AUX”. Any time you are asked for a variable name, you can key in one of the built in names, or make up one of your own. Use **[ALT] V** to see all of your variables.

By using variables, you can move data from place to place such as from the badge reader to the display.

The names of the default variables give you a hint as to how to use them. The name of a variable does not in any way affect what you can use it for. A name is just a way of referring to the same group of characters.

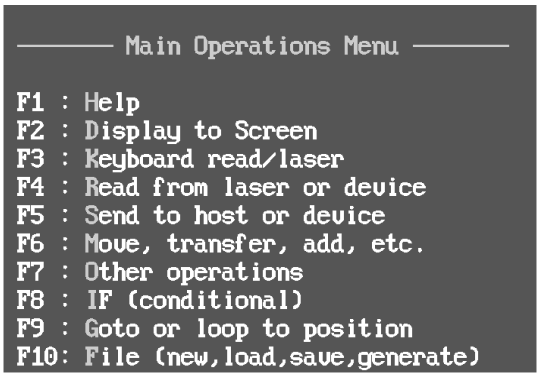
Variable names must not start with a quote mark (“) or a digit. It is good practice to use just one word. Upper and lower case does not matter.

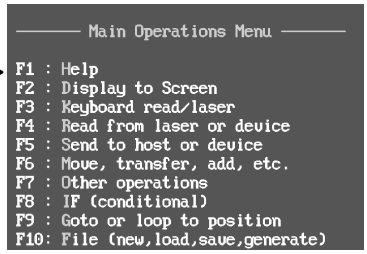
In many cases where you are asked for a variable name, you can key in a number or a string. (A string is characters enclosed in quotes.) These are constants.

Main Operations Menu

The Main Operations Menu, like all AG menus, is located in the upper right of the screen. An explanation of the choices it presents appears below.

Figure 3.1
The Application Generator Main Screen and Main Operations Menu.

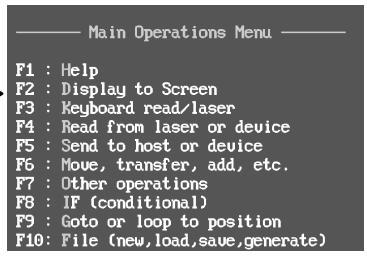

Main Operations Menu
F1 : Help
F2 : Display to Screen
F3 : Keyboard read/laser
F4 : Read from laser or device
F5 : Send to host or device
F6 : Move, transfer, add, etc.
F7 : Other operations
F8 : IF (conditional)
F9 : Goto or loop to position
F10: File (new,load,save,generate)


Main Operations Menu
F1 : Help
F2 : Display to Screen
F3 : Keyboard read/laser
F4 : Read from laser or device
F5 : Send to host or device
F6 : Move, transfer, add, etc.
F7 : Other operations
F8 : IF (conditional)
F9 : Goto or loop to position
F10: File (new,load,save,generate)

F1 – General Help

The last two lines of the display contain ‘field specific’ help information at all times.

Selecting **F1** brings up the context sensitive help system.


Main Operations Menu
F1 : Help
F2 : Display to Screen
F3 : Keyboard read/laser
F4 : Read from laser or device
F5 : Send to host or device
F6 : Move, transfer, add, etc.
F7 : Other operations
F8 : IF (conditional)
F9 : Goto or loop to position
F10: File (new,load,save,generate)

F2 – Display To Screen

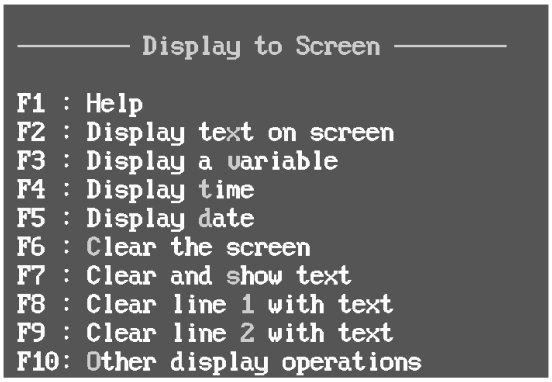
The Display Menu (**F2**) is used to display text, variables, date or time on the workstation. It is also used to clear the display.

The size and format of each field is controlled by pressing the plus key (+) and the minus key (–). The arrow keys are used to position the field on the screen.

Note that if you select a variable to display, make sure to use the plus key (+) to make the field as long as the data you want to display. If the field is too small then characters will be truncated.

When **F2** is pressed the Main Operations Menu is replaced with the options shown in Figure 3.2.

Figure 3.2
AG Display to Screen Menu


Display to Screen
F1 : Help
F2 : Display text on screen
F3 : Display a variable
F4 : Display time
F5 : Display date
F6 : Clear the screen
F7 : Clear and show text
F8 : Clear line 1 with text
F9 : Clear line 2 with text
F10: Other display operations

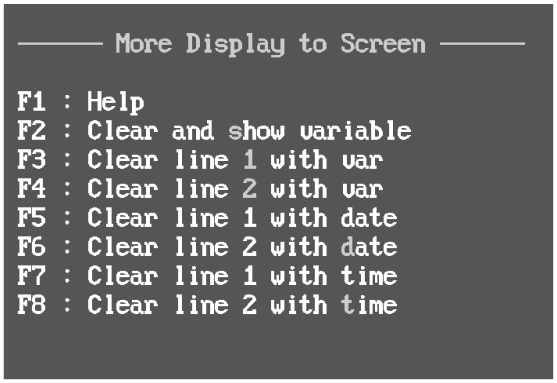
In options **F2**, **F3**, and **F7–F9**, you are prompted to enter the text or the variable name. When you provide a name it is shown on the workstation display in the upper right corner of the CRT. You then use the arrow keys to position it, and the plus and minus keys to choose the size of the field. When both are to your satisfaction, press **[ENTER]** to write the statement in the program.

In options **F4** and **F5**, the time or date is displayed on the screen representing the workstation display. You use the arrow keys to move the time/date to the desired position, then press **[ENTER]** to write the statement.

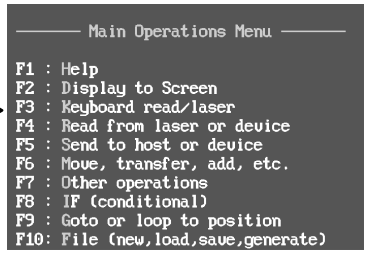
Option **F6** clears the workstation's display.

Option **F10** offers various clear functions.

Figure 3.3
AG More Display to Screen Menu

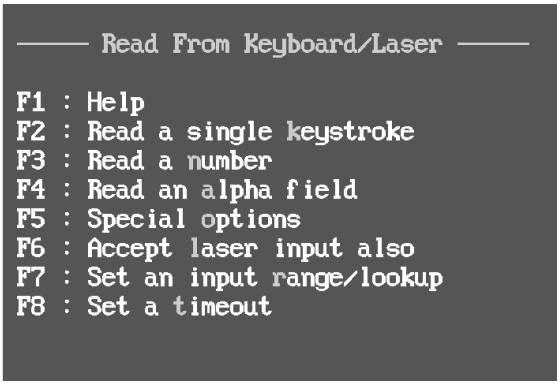

More Display to Screen
F1 : Help
F2 : Clear and show variable
F3 : Clear line 1 with var
F4 : Clear line 2 with var
F5 : Clear line 1 with date
F6 : Clear line 2 with date
F7 : Clear line 1 with time
F8 : Clear line 2 with time

F3 – Keyboard Read/Laser


Main Operations Menu
F1 : Help
F2 : Display to Screen
F3 : Keyboard read/laser
F4 : Read from laser or device
F5 : Send to host or device
F6 : Move, transfer, add, etc.
F7 : Other operations
F8 : IF (conditional)
F9 : Goto or loop to position
F10: File (new,load,save,generate)

The Keyboard Read menu is used to read fields and characters from the keyboard. When you chose one of these attributes a message is displayed on the next to last line of the CRT. Then the attribute is added to the read statement in the program. When **F3** is pressed the Main Operations Menu is replaced with these options:

Figure 3.4
AG Read From Keyboard/Laser Menu


Read From Keyboard/Laser
F1 : Help
F2 : Read a single keystroke
F3 : Read a number
F4 : Read an alpha field
F5 : Special options
F6 : Accept laser input also
F7 : Set an input range/lookup
F8 : Set a timeout

Note: Since there are many options that can be selected for reading, you will have to press **[ENTER]** until the Main Operations Menu is shown in order to store a READ operation. Watch the help line at the bottom of your computer screen.

If you choose **F2 – READ A SINGLE KEYSTROKE** then the key number will be placed into the input variable. An example use of this choice would be in a Time & Attendance program when you need to know if the employee is checking IN or OUT; the entry could be the single keystroke of the (IN) or (OUT) key. Some of the more important ·numbers are:

F1 = 225	**F2** = 226	**F3** = 227	**F4** = 228	**F5** = 229
F6 = 230	**F7** = 231	**F8** = 232	**F9** = 233	**F10** = 234
[ENTER] = 13	IN = 43	OUT = 45	CLEAR = 127	SPACE = 32
EXIT = 159	UP = 24	LEFT = 8	DOWN = 25	RIGHT = 26

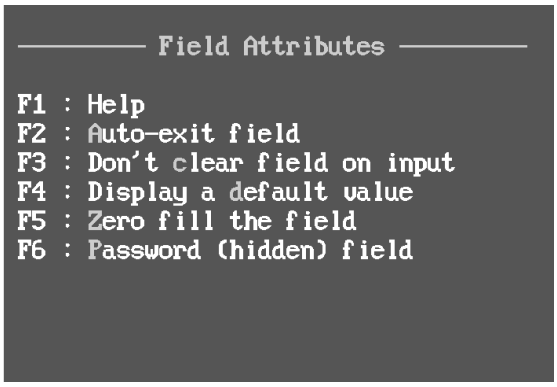
The **F3 – READ NUMBER** will create a numeric field. The input will be converted into a number.

ATTENTION: The limits of this numeric field are +2, 147, 483, 647 maximum to – 2, 147, 483, 647 minimum. If a value is entered that is outside of this range the number will overflow to an incorrect value. If very large positive or negative numbers are expected, then set an input range to the above limits (see **F7** option).

The **F4 – READ ALPHA** creates a field which will allow entry of all displayable characters.

The **F5 – SPECIAL OPTIONS** which can be selected for reading fields are:

Figure 3.5
AG Field Attributes Menu


Field Attributes
F1 : Help
F2 : Auto-exit field
F3 : Don't clear field on input
F4 : Display a default value
F5 : Zero fill the field
F6 : Password (hidden) field

AUTOEXIT: When the operator has entered as many characters as are in the field, then the read is completed. 'Autoexit' is added to the Keyboard read statement.

DON'T CLEAR: Prevents the field from being cleared on the first character typed (see default). 'No Clear' is added to the Keyboard read statement.

DEFAULT: The previous value of the variable is shown instead of displaying a blank field. 'Default' is added to the Keyboard read statement.

ZERO FILL: Numeric field is right justified with zeros. 'Zerofill' is added to the Keyboard read statement.

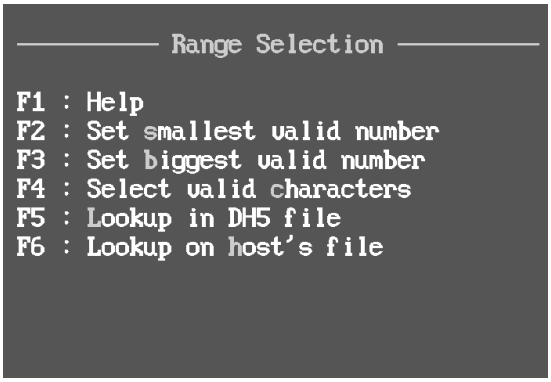
PASSWORD: ***'s are shown instead of the characters typed. 'Secure' is added to the Keyboard read statement.

If the **F6 – ACCEPT LASER INPUT ALSO** is selected then the laser is included in the read statement.

Note: Range checks and other edit checks do not apply to this option.

When the **F7 – SET AN INPUT RANGE/LOOKUP** is entered the following sub-menu is displayed:

Figure 3.6
AG Range Selection Menu


Range Selection
F1 : Help
F2 : Set smallest valid number
F3 : Set biggest valid number
F4 : Select valid characters
F5 : Lookup in DH5 file
F6 : Lookup on host's file

Smallest #: You enter the lowest numeric number for the input value. For example, it can be entered as the number 20, or if the variable AGE = 20 then you can enter the variable name, AGE.

Biggest #: You enter the biggest numeric number for the input value. For example, it can be entered as the number 9999, or if the variable MOST = 9999 then you can enter the variable name, MOST.

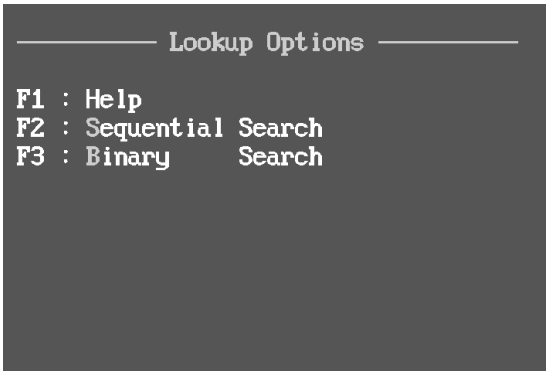
When the program is running, if the value entered is not within the range, then * OUT OF RANGE * is displayed and the user is prompted to enter the number again.

VALID CHARACTERS: You specify a set of characters that can be used during entry. Anything not in the set will not be displayed.

This applies only to the one read statement you attach this attribute to. An example use might be: Departments are coded A, B, C, and D. When the operator enters the Department field, if the read statement has the valid character set as {A,B,C,D], then no other characters will be displayed.

Lookup in workstation file: You enter the name of the Lookup File and the starting character position to compare.

Figure 3.7
AG Lookup Options Menu



Lookup in Host file: You enter the name of the Lookup File and the starting character position to compare. These lookups are performed by your host computer. Allen-Bradley Network Manager Software (Catalog No. 2708-NNM) V5.0 must be installed and running on your host computer in order for host lookups to work.

This allows a workstation program to always have up to the minute information about a file which is being maintained by the host computer.

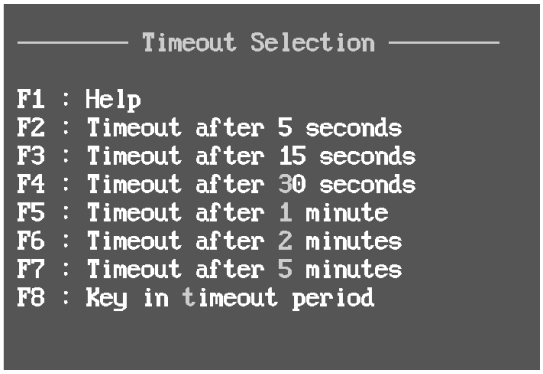
The LOOKUP options allow you to restrict input to values which match those in a workstation file or in a HOST file. It is a method of verifying data against a file or obtaining records from a file. A text file must first be created using a text editor or another program.

Lookups can be selected here or in the sub-menu from the Move/Transfer/Add menu.

Note: When using Read lookups, the data read from the file is *always* placed in the OUT variable.

If the **F8 – SET A TIMEOUT** option is chosen, you are given the choice of setting the timeout from seconds to minutes. The following sub-menu is displayed:

Figure 3.8
AG Timeout Selection Menu

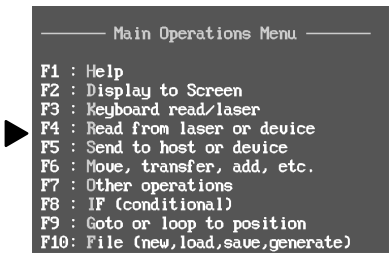

Timeout Selection
F1 : Help
F2 : Timeout after 5 seconds
F3 : Timeout after 15 seconds
F4 : Timeout after 30 seconds
F5 : Timeout after 1 minute
F6 : Timeout after 2 minutes
F7 : Timeout after 5 minutes
F8 : Key in timeout period

Timeouts are a way of stopping a read operation before the operation has finished. If your program is waiting for the user to enter his password and the user walks off and leaves the workstation, you want your program to restart after a given amount of time.

When you select a timeout you are also asked to specify where you want to branch to when the timeout occurs. To select the GOTO statement, you can use the arrow keys to select the destination statement or enter the statement number.

This option is appended to the Read statement and replaces any previous timeout.

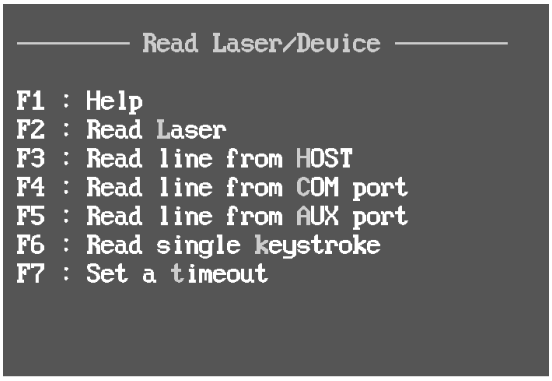
Note: You stay in the Read from Keyboard/Laser Menu after selecting an attribute. More than one attribute can be selected for a single read statement. Be sure to press **[ENTER]** and return to the Main Operations Menu for the read statement to be entered into your program.


Main Operations Menu
F1 : Help
F2 : Display to Screen
F3 : Keyboard read/laser
F4 : Read from laser or device
F5 : Send to host or device
F6 : Move, transfer, add, etc.
F7 : Other operations
F8 : IF (conditional)
F9 : Goto or loop to position
F10: File (new,load,save,generate)

F4 – Read From Laser Or Device

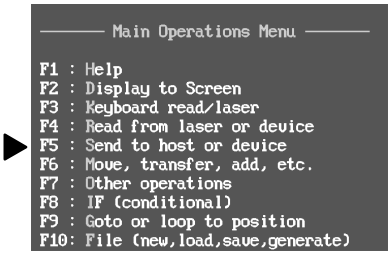
The Read From Laser or Device menu is used to read fields and characters from devices other than the keyboard. When **F4** is pressed the Main Operations Menu is replaced with these options:

Figure 3.9
AG Read Laser/Device Menu


Read Laser/Device
F1 : Help
F2 : Read Laser
F3 : Read line from HOST
F4 : Read line from COM port
F5 : Read line from AUX port
F6 : Read single keystroke
F7 : Set a timeout

In the options **F2** through **F6**, you are prompted on the next to the last line: 'Read into Variable Name : ". **IN** is the default variable. Press **[ENTER]** to store the operation.

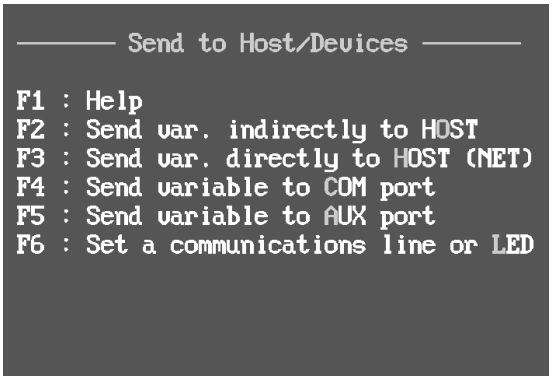
The **F7** option is appended to the Read statement and replaces any previous timeout.


Main Operations Menu
F1 : Help
F2 : Display to Screen
F3 : Keyboard read/laser
F4 : Read from laser or device
F5 : Send to host or device
F6 : Move, transfer, add, etc.
F7 : Other operations
F8 : IF (conditional)
F9 : Goto or loop to position
F10: File (new,load,save,generate)

F5 – Send To Host Or Device

The **F5 – SEND TO HOST OR DEVICE** option is used to send data to the host, send data out a communications port, or to control the workstation LED indicators. When **F5** is pressed the Main Operations Menu is replaced with these options:

Figure 3.10
AG Send to Host/Devices Menu


Send to Host/Devices
F1 : Help
F2 : Send var. indirectly to HOST
F3 : Send var. directly to HOST (NET)
F4 : Send variable to COM port
F5 : Send variable to AUX port
F6 : Set a communications line or LED

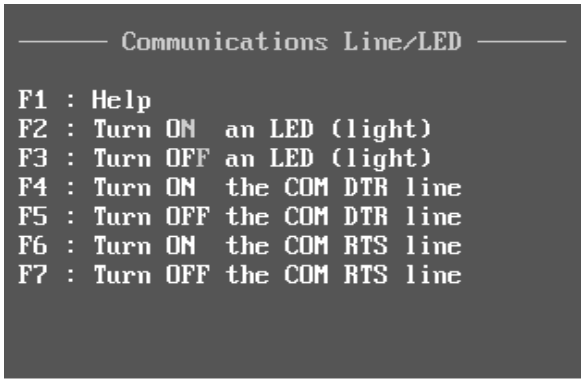
In the **F2** – **SEND VARIABLE INDIRECTLY TO HOST** option, the record sent is held in the workstation queue memory until the Host polls. The number of records sent when the Host if offline is dependent of the amount of memory in the workstation.

In the **F3** – **SEND VARIABLE DIRECTLY TO HOST (NET)** option, a record can be sent only when the Host is online. If you send a record when the Host if offline then the next record cannot be sent until the Host comes online and receives the record. Use this option *only* when you know the Host is online.

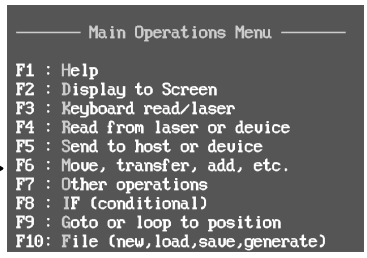
In the options **F2** through **F5**, you are prompted on the next to the last line: "Variable to send to ... . ". OUT is the default variable. Press **[ENTER]** to store the operation.

When **F6** is chosen the following menu appears:

Figure 3.11
AG Communications Line/LED Menu


Communications Line/LED
F1 : Help
F2 : Turn ON an LED (light)
F3 : Turn OFF an LED (light)
F4 : Turn ON the COM DTR line
F5 : Turn OFF the COM DTR line
F6 : Turn ON the COM RTS line
F7 : Turn OFF the COM RTS line

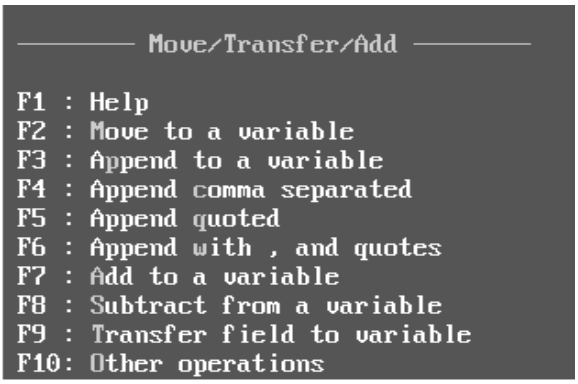
In options **F2** and **F3**, you are prompted : "Enter LED number (1 to 10):". The numbers reference the function keys. The other options have no prompts, they just write a statement in your program to perform the operation.


Main Operations Menu
F1 : Help
F2 : Display to Screen
F3 : Keyboard read/laser
F4 : Read from laser or device
F5 : Send to host or device
F6 : Move, transfer, add, etc.
F7 : Other operations
F8 : IF (conditional)
F9 : Goto or loop to position
F10: File (new,load,save,generate)

F6 – Move, Transfer, Add, Etc.

When **F6** is pressed, you are first prompted for a destination variable which will be modified by the operation. Then the Main Operations Menu is replaced with these options:

Figure 3.12
AG Move/Transfer/Add Menu


Move/Transfer/Add
F1 : Help
F2 : Move to a variable
F3 : Append to a variable
F4 : Append comma separated
F5 : Append quoted
F6 : Append with , and quotes
F7 : Add to a variable
F8 : Subtract from a variable
F9 : Transfer field to variable
F10: Other operations

These options are described below:

MOVE: This is used to copy the contents of one variable to another, or to set a variable to a value or text string. To clear a variable set it to " ".

APPEND: Appends a variable or text string onto the end of another. This is often used in building a record for sending to the host.

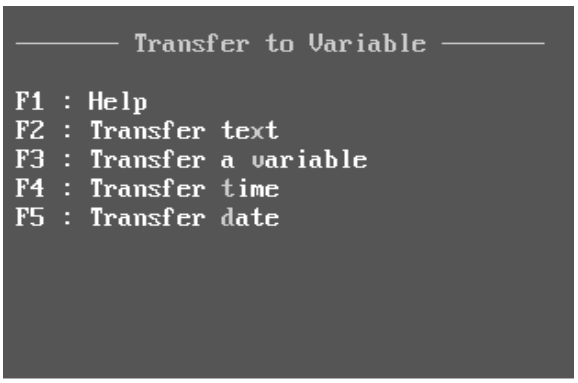
ADD: This will convert the variable into a number and add a value.

SUBTRACT: This will convert the variable into a number and subtract a value.

TRANSFER: Transfers are the most powerful way of manipulating variables. These allow you to edit the contents of a variable in the same way you can edit the screen using the display operations.

The following sub-menu lists your options here:

Figure 3.13
AG Transfer to Variable Menu



Variables, text, date and time can be positioned within the variable (this is shown on the second to the last line of the display). The (+) and (–) will change the field size and format, while left and right arrows are used for positioning.

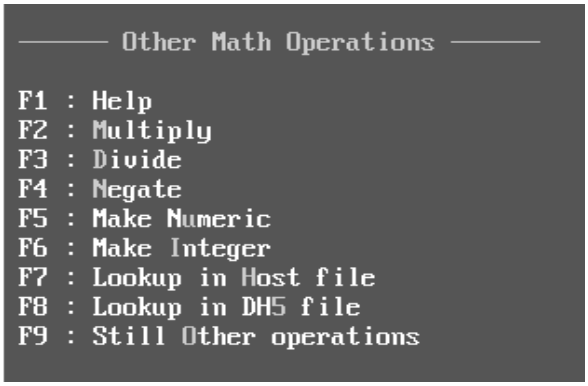
Important: It is best to be in single step mode while entering transfers since that is the easiest way to see the relationship between fields that are being formatted.

Transfers are fixed length operations that always pad with spaces. If this is not what you want, you may want to use Append or the advanced operations. When you position a variable using a transfer, be sure the field is long enough (using (+)).

Note: Be sure to observe the second to the last line on the monitor for the position of the data being transferred into your variable.

OTHER OPERATIONS: The following sub-menu appears:

Figure 3.14
AG Other Math Operations Menu


Other Math Operations
F1 : Help
F2 : Multiply
F3 : Divide
F4 : Negate
F5 : Make Numeric
F6 : Make Integer
F7 : Lookup in Host file
F8 : Lookup in DH5 file
F9 : Still Other operations

MULTIPLY: Will operate on any variable.

DIVIDE: Will operate on any variable. It may result in a floating point number.

NEGATE: Is used to alter the sign of a value.

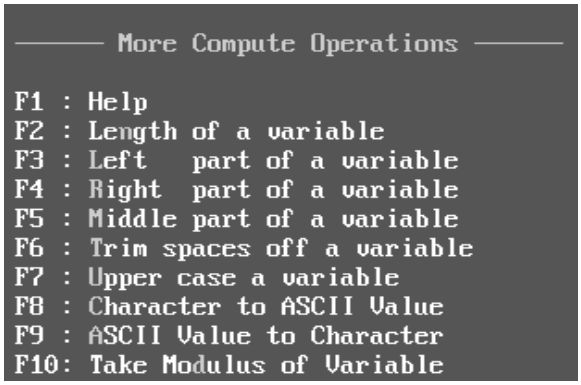
MAKE NUMERIC: Will get rid of any non-numeric parts to a text value. This is a side effect of other math operations.

MAKE INTEGER: Will remove the fractional part of a number.

LOOKUP: This option is described on page 3 – 7.

STILL OTHER OPERATIONS: The following sub-menu appears:

Figure 3.15
AG More Complete Operations Menu


More Compute Operations
F1 : Help
F2 : Length of a variable
F3 : Left part of a variable
F4 : Right part of a variable
F5 : Middle part of a variable
F6 : Trim spaces off a variable
F7 : Upper case a variable
F8 : Character to ASCII Value
F9 : ASCII Value to Character
F10: Take Modulus of Variable

LENGTH: Returns the number of characters in a variable

LEFT: Isolates the left 'n' characters from a variable. Left 4 characters of IN = 092890, returns 0928.

RIGHT: Isolates the right 'n' characters from a variable. Right 2 characters of IN = ABCDEFG, returns FG.

MIDDLE: Is used to get data from the middle of a variable. Warning! If you use middle on a variable that is too short and try to get characters that are not present, AG will abort. The 2 middle characters, starting in position 3 will return the following:

Variable = ABCDEFG	returns	CD
Variable = ABC	returns	program abort

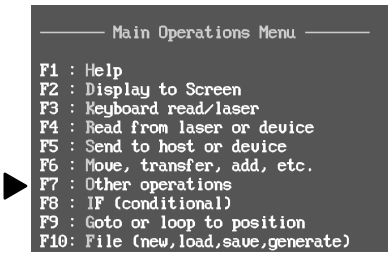
TRIM: Removes spaces from the front and back of a variable.

UPPER CASE: Converts a variable into upper case.

CHAR and ASCII: converts the exchange character values into ASCII and back to characters.

MODULUS: Is the positive remainder from a division operation.

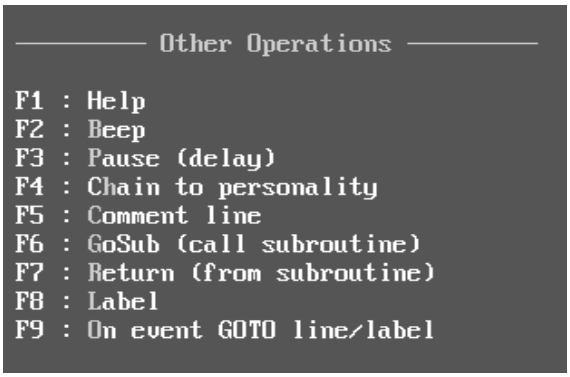
Note: Watch the 'Contents of Variables' lines to see what each variable is set equal to as the program runs in the stepping mode.


Main Operations Menu
F1 : Help
F2 : Display to Screen
F3 : Keyboard read/laser
F4 : Read from laser or device
F5 : Send to host or device
F6 : Move, transfer, add, etc.
F7 : Other operations
F8 : IF (conditional)
F9 : Goto or loop to position
F10: File (new,load,save,generate)

F7 – Other Operations

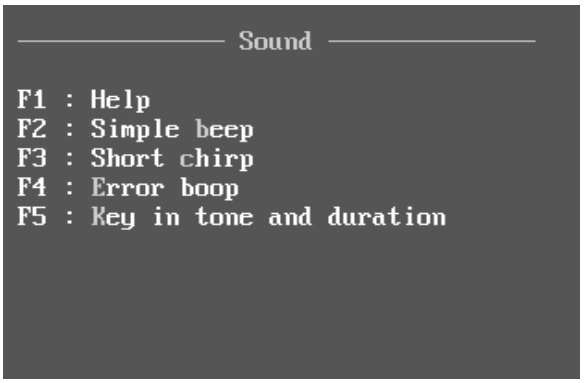
When **F7 – OTHER OPERATIONS** is selected the Main Operations Menu is replaced with these options:

Figure 3.16
AG Other Operations Menu


Other Operations
F1 : Help
F2 : Beep
F3 : Pause (delay)
F4 : Chain to personality
F5 : Comment line
F6 : GoSub (call subroutine)
F7 : Return (from subroutine)
F8 : Label
F9 : On event GOTO line/label

F2 – Beep: When the **F2 – BEEP** option is chosen the following sub-menu appears:

Figure 3.17
AG Sound Menu



Beep: The tone is set to 1000 Hz for 0.25 (1/4) of a second.

Chirp : The tone is set to 2000 Hz for 0.15 of a second.

Boop: The tone is set to 300 Hz for 1 second.

Key in.. .: The workstation can produce sounds in the range of 100 to 3000 Hz. A low sounding tone is around 200 Hz. A high pitched tone is above 2000 Hz.

The loudness of the sound will vary depending on the frequency. Your PC will only produce an approximation of the actual sound produced by the workstation.

F3 – Pause: You can pause your program for any number of seconds. Use this to leave a prompt on the display long enough for the user to read it.

While you are testing your program, even a pause as short as 0.1 seconds will take a full second to execute on the PC. When you generate your program, the downloaded version will pause for the selected interval.

F4 – Chain to Personality: If your program becomes too large to run as a single program then you will need to use *chaining*. This is a method of having one program start the execution of another.

In order to use chaining, you will need to put CHAIN operations in the main program to start up your subprogram. Then in the subprogram, you will need a CHAIN that restarts the main program when the operation is completed.

The chain operation does not save the contents of user variables so you will need to make sure that the operations are entirely separate in order for chaining to be useful.

Chaining Requirements: Note that to download the files, you must use the FILE DOWNLOAD feature of the Network Manager Software (Catalog No. 2708-NNM) V5.0. This is in the FILE SERVICES menu of the Network Manager Software and is NOT the same as PROGRAM DOWNLOAD. Both your main program and your subprograms must be loaded using FILE DOWNLOAD.

You can start the main program by making a small program containing only the statement: CHAIN “MAIN” and using PROGRAM DOWNLOAD.

Alternatively you can start the main program using the Start Program feature: NM 5.0. This feature is not normally accessible. You will need to add it to one of the NM menus before you can get to it.

Global Variables: Chained programs may make use of GLOBAL variables. These are variables whose value is accessible by all of the chained programs. The names of the global variables must be placed in a text file named “GLOBAL.DEF” in your program directory using a text editor. Put one variable name on each line.

Important: The GLOBAL.DEF file is *not* downloaded to the workstation. Keep it in the subdirectory of the program you will use.

ATTENTION: Once you have created GLOBAL.DEF you may only ADD variable names to the end of the list. If you insert or delete old names then you will damage your existing AG Personalities that use globals.

A maximum of 99 global variables may be defined. Using a lot of globals will significantly slow down chaining your programs.

F5 – Comment line: This allows you to put comments into your program. For example, the first line of the program might be a Comment line stating the program name and purpose. The comment line is identified by a single quote (‘) at the beginning of the line.

F6 – GoSub (Call Subroutine): A GOSUB is a way of calling a subroutine. The subroutine can do its job and then return to the line immediately after the GOSUB statement. This makes it easier to write programs that have the kind of structure found in high level languages such as A-B VBASIC.

F7 – Return (From Subroutine): When you write the subroutine that is called by the GOSUB statement, you must be sure to put a RETURN operation at the last line of the GOSUB. If you execute too many GOSUBs without returning you will get a stack overflow error.

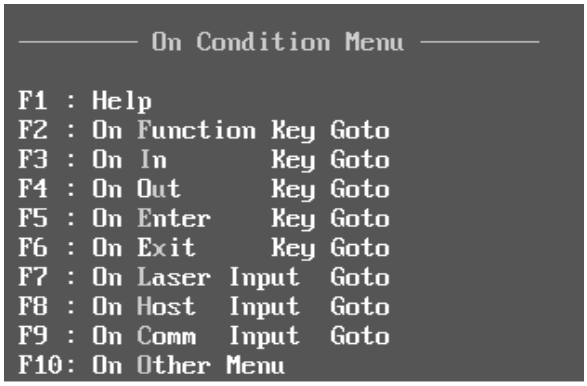
F8 – Label: Line numbers work well for writing simple programs that you will not have to change often. For better structured programs you should use *labels*. A label is a name for a line in your program. The advantage is that the GOTO or GOSUB will have a name that makes sense instead of a meaningless line number.

You can place a label anywhere in your program using the LABEL option in the OTHER OPERATIONS menu. When you key in a GOTO, you can use the label name instead of a line number.

When you are prompted for the line/label name, if you key in a label name that does not currently exist, you will be asked if you would like to put the label somewhere in your program. This is a nice shortcut for entering the labels.

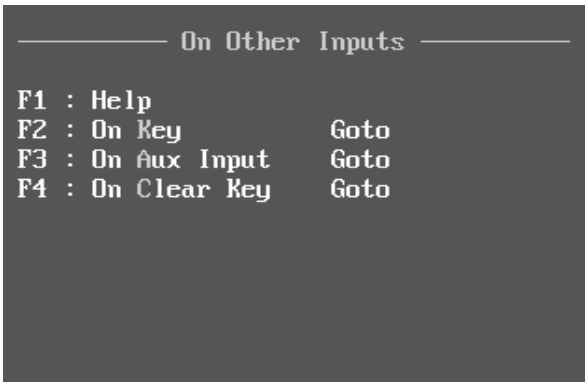
F9 – ON Event GoTo Line/Label Operations: The ON event operation is a way of branching to more than one place depending on the condition of a previous operation. If the condition is met then the program will branch to the line number or label you define. The previous operation is defined from the following menu selections:

Figure 3.18
AG On Condition Menu


On Condition Menu
F1 : Help
F2 : On Function Key Goto
F3 : On In Key Goto
F4 : On Out Key Goto
F5 : On Enter Key Goto
F6 : On Exit Key Goto
F7 : On Laser Input Goto
F8 : On Host Input Goto
F9 : On Comm Input Goto
F10: On Other Menu

The other menu contains these conditions that you can test for:

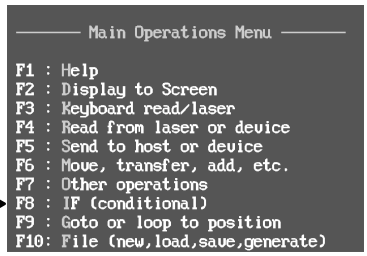
Figure 3.19
AG On Other Inputs Menu



Note: The destination variable must be in the IN variable.

Adding A-B VBASIC Functions

A-B VBASIC Functions are added to the Other Operations Menu by modifying the file AGUSER.BAS. You may add up to 10 named statements which will appear in a sub-menu named Additional Operations.

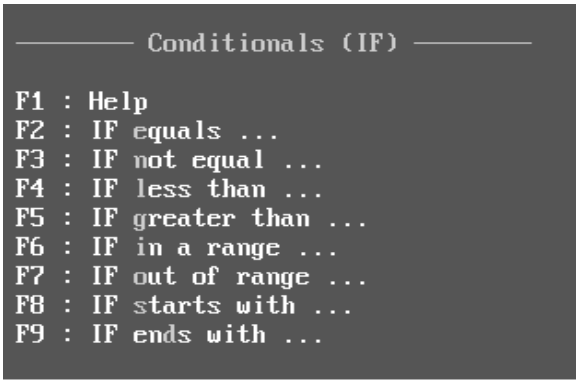

Main Operations Menu
F1 : Help
F2 : Display to Screen
F3 : Keyboard read/laser
F4 : Read from laser or device
F5 : Send to host or device
F6 : Move, transfer, add, etc.
F7 : Other operations
F8 : IF (conditional)
F9 : Goto or loop to position
F10: File (new,load,save,generate)

F8 – IF (Conditional)

An IF statement is another way of changing the order or program execution. It allows you to GOTO a statement IF a variable is in some state.

When **F8 – IF** is chosen you are asked for the Variable to compare. Then the Main Operations Menu is replaced with this sub-menu:

Figure 3.20
AG Conditionals (IF) Menu

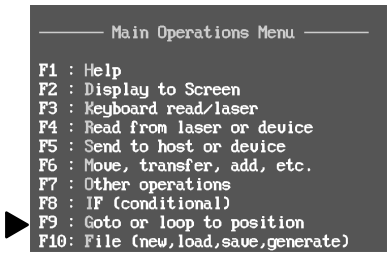

Conditionals (IF)
F1 : Help
F2 : IF equals ...
F3 : IF not equal ...
F4 : IF less than ...
F5 : IF greater than ...
F6 : IF in a range ...
F7 : IF out of range ...
F8 : IF starts with ...
F9 : IF ends with ...

In **F2** through **F5**, you are prompted with "Value (text in quotes) or Variable name to compare : ". For example, you might have entered **IN** as the variable to compare immediately after pressing **F8**, then after you chose **F4** (If less than ..) you might enter 9999, if you want to be sure the number that was input into the IN variable was less than 9999. Then you are prompted to enter the GOTO statement number if your compare is true. You can enter the number or use the up/down arrows to find the statement and press enter.

In **F6** and **F7**, you are prompted to enter both the lower limit and the upper limit of the range. Then you are prompted to enter the GOTO statement number if your compare is true. You can enter the number or use the up/down arrows to find the statement and press enter.

In **F8** and **F9** the 'starts with' and 'ends with' are used to branch (GOTO) if the variable starts or ends with some piece of text. You will usually type quotation marks (") in front of the text being checked.

After you have entered the compare data, (text as above, a numeric, or another variable), you are prompted to enter the GOTO statement number if your compare is true. You can enter the number or use the up/down arrows to find the statement and press **[ENTER]**.

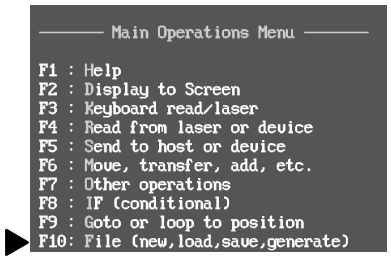

Main Operations Menu
F1 : Help
F2 : Display to Screen
F3 : Keyboard read/laser
F4 : Read from laser or device
F5 : Send to host or device
F6 : Move, transfer, add, etc.
F7 : Other operations
F8 : IF (conditional)
F9 : Goto or loop to position
F10: File (new,load,save,generate)

F9 – GoTo Or Loop To Position

A GOTO is a way of changing the order in which operations are performed in your program. A program which contains no GOTOs will do one step after another until it reaches the last step. Then it will stop.

Each GOTO specifies the line number to which the program should advance when the GOTO operation is reached. You can either key in a line number, enter a label or use the up and down arrow keys to find where you would like to go. Press **[ENTER]** when you have made your selection.

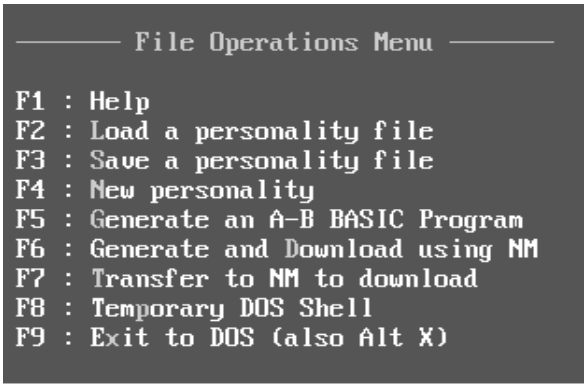
When choosing this option, *note the prompt on the next to last line of the CRT*; "Go to line number : ". You can enter the number or use the up/down arrows to find the statement and press **[ENTER]**.


Main Operations Menu
F1 : Help
F2 : Display to Screen
F3 : Keyboard read/laser
F4 : Read from laser or device
F5 : Send to host or device
F6 : Move, transfer, add, etc.
F7 : Other operations
F8 : IF (conditional)
F9 : Goto or loop to position
F10: File (new,load,save,generate)

Fl0 – File (New, Load, Save, Generate)

When **F10 – FILE** is chosen the Main Operations Menu is replaced with these options:

Figure 3.21
AG File Operations Menu


File Operations Menu
F1 : Help
F2 : Load a personality file
F3 : Save a personality file
F4 : New personality
F5 : Generate an A-B BASIC Program
F6 : Generate and Download using NM
F7 : Transfer to NM to download
F8 : Temporary DOS Shell
F9 : Exit to DOS (also Alt X)

The **F2** or **F3** options are for loading or saving your personalities.

> A personality name is an 8 character name that contains only the letters A to Z and 0 to 9. The name is used to create DOS files which contain the personality.
>
> Select personality names that will make them easy to remember. If you are in the \ AG directory, you can list all of your personalities from the DOS prompt by typing : DIR *.AIP

The **F4** option will clear the operations area of the CRT of all program statements. The area will have only:

<Start of Program>

==> <End of Program>

You can now start creating your program.

The **F5** option is used to generate a A-B VBASIC Program that can be downloaded into the workstation network.

The **F6** option is used to generate and download using Network Manager Software (Catalog No. 2708-NNM). The PC must be running NM V5.0 or later.

The **F7** option transfers you to NM to download you program. Use the Network Manager Software program to download your generated personality to your -DH5 workstation.

The **F8 – Temporary DOS Shell** option provides a temporary exit to DOS. Typing **EXIT** in DOS will return you to AG.

The **F9 – Exit to DOS** (also **[ALT] X**) option allows you to save your personality before exiting to DOS.

Editing a Program

Entering **[ALT]E** from the keyboard allows you to use the full screen edit mode to make changes or comments in your program. Full screen edit mode lets you edit *only* existing lines in the program under development. You cannot use it to create new lines.

For example, if you want to edit line 20 of a program, press **[ALT]E**, use the cursor to move to line 20, then press the **[ENTER]** key and change the constants or operation instructions on that line.

If you want to insert a line, first press **[ESC]** to return to the default split screen. Then scroll the program listing until the line immediately preceding the location of the new line is at the top of the listing window. For example, if you want to add a new line between the existing lines 20 and 21, position line 20 at the top of the window. Then select the operation you want to insert from the menu and follow the prompts at the bottom of the screen. Press **[ENTER]** to accept the new line and insert it in the program.

Important: Be sure to position the program listing in the lower window carefully before inserting a new line, as the new line will *always* appear immediately after the top line in the window.

Note: Use **VCHAD.EXE** or **XCHAD.EXE** (if installed) to change the screen colors on LCD or gas plasma equipped Toshiba laptops to make highlighted text more visible. **VCHAD.EXE** is designed for VGA systems, and **XCHAD.EXE** is designed for EGA systems.

Chapter 4

Running & Compiling Applications

Introduction

In this chapter you will find information on:

- Running your program
- Compiling your program
- Downloading your program

Running a Program

Once you have typed in your your program, you can run it in the AG environment (by selecting **[ALT]R**). This offline simulation feature allows you to thoroughly test your program before downloading it.

When the personality behaves as you expect, save it in its final form. You can use the personality name in which you have been working, or create a new one. Use standard DOS file naming conventions when assigning a name. No extension is necessary, as the AG software adds its own extensions to the files it creates during compilation.

Compiling and Downloading a Program

Once saved in its final form, you can generate an A-B VBASIC program that can be downloaded into the DH5 network. This program will behave as did your development personality in the AG environment. Your Network Manager software should be installed and set up before you begin downloading.

To compile a downloadable application program:

1. In the Main Operations Menu select **F10 – File (new, load, save, generate)**.
2. In the File Operations menu, select either **F6 – Generate and Download using NM** or **F7 – Transfer to NM to download**.
3. Having selected **F10 – File** you will generate a program that is ready to download to the Network Manager Software at a later time. Having selected **F10 – File**, you will be in the process of downloading that compiled program for immediate use.

Note: For information on setting up and using Network Manager, please refer to the *Network Manager Software User Manual* (Publication 2708-802).

Appendix A

Sample Program Listing

Default Personality

The listing that follows is for the default personality that appears at the bottom of the Main Menu when you first start AG. You can accept this personality simply by pressing [ENTER].

```
----- Personality DEFAULT generated by A.G. V3.0 at 01:20 pm on 04-Feb-94

 1 '----- Simple Example Default AG Program -----
 2 'Created by John Fogarty : 11-Oct-90
 3 Restart:
 4      DISPLAY w/CLS  7 27 from "ALLEN-BRADLEY COMPANY, INC."
 5 UpdateTime:
 6      DISPLAY 41 9 from TIME
 7      DISPLAY 72 9 from DATE
 8     READ KBD LASER to IN  0 0  on Timeout 3000 goto UpdateTime(5)
 9         ON Laser INPUT GOTO SendBadge(42)
10         ON F1 KEY GOTO F1-Pressed(17)
11         ON F2 KEY GOTO F2-Pressed(24)
12         ON F3 KEY GOTO F3-Pressed(28)
13         ON F4 KEY GOTO F4-Pressed(35)
14      DISPLAY w/CLR2  48 24 from "***** Use F1 to F4 *****"
15        PAUSE 1
16         GOTO Restart(3)
17 F1-Pressed:
18      DISPLAY w/CLS  15 11 from "Clocking In"
19         MOVE "IN" to OP
20 AskForBadge:
21      DISPLAY w/CLR2  49 24 from "Please Enter a Badge Now"
22   READ LASER to IN
23         GOTO SendData(45)
24 F2-Pressed:
25      DISPLAY w/CLS  14 12 from "Clocking Out"
26         MOVE "OUT" to OP
27         GOTO AskForBadge(20)
28 F3-Pressed:
29      DISPLAY w/CLS  11 18 from "Manual Field Entry"
30      DISPLAY 41 10 from "Operation:"
31      DISPLAY 58 5 from "Data:"
32     READ KBD to OP  51 1 AutoExit  on Timeout 3000 goto Restart(3)
33     READ KBD to IN  63 18  on Timeout 3000 goto Restart(3)
34         GOTO SendData(45)
35 F4-Pressed:
36      DISPLAY w/CLS  12 17 from "Move Ticket Entry"
37         MOVE "M " to OP
38      DISPLAY 41 17 from "Destination Code:"
```

```
          39      READ KBD to DEST  59 8 n>=100 n<=5000  on Timeout 3000 goto
      Restart(3)
            40       APPEND DEST to OP
            41         GOTO AskForBadge(20)
            42 SendBadge:
            43 '----- Badge is sent to the host -----
            44         MOVE "Badge" to OP
            45 SendData:
            46 CLEAR SCREEN
            47        SOUND 1000, .25
            48         MOVE Sys:DATE to NET
            49       APPEND Sys:TIME to NET comma separated
            50       APPEND OP to NET comma separated
            51       APPEND IN to NET comma separated
            52         SEND NET to host data QUEUE
            53      DISPLAY 15 9 from "Thank You"
            54        PAUSE .5
            55         GOTO Restart(3)

      - Generation completed with no errors.
      - Basic file DEFAULT.BAS contains 647 lines.
      - LXB compilation.

NO ERRORS DETECTED

- DEFAULT.LXE can be downloaded to LINX terminals
```

You can run the personality default personality by pressing [ALT]**R**. Press [ESC] at any time to cancel the execution of the personality.

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